

ASSIGNMENT 8

Textbook Assignment: "Air Conditioning and Refrigeration," "Solar Energy," and "Environmental Pollution Control."
Pages 14-17 through 16-3.

- 8-1. Which of the following types of motors should be used for a 5-horsepower, high-starting torque requirement?
1. Split-phase
 2. Capacitor-start, capacitor-run
 3. Permanent split-phase
 4. Capacitor-start, induction-run
- 8-2. The permanent split-phase motor circuit differs from a split-phase in which, if any, of the following ways?
1. It requires a start capacitor in series with the start winding
 2. It uses a run capacitor in series with the start winding
 3. It requires a start relay
 4. None of the above
- 8-3. Start windings are used in single-phase motors designed for use with hermetic refrigeration for which of the following reasons?
1. The motors start under load conditions
 2. The compressors are operated at two speeds
 3. The motors start under no-load conditions
 4. The start winding is a standby winding
- 8-4. The opposition to the flow of alternating current caused by the inductance and capacitance in the run winding is a result of
1. low reactance
 2. high reactance
 3. low resistance
 4. high resistance
- 8-5. When using an ohmmeter to identify motor terminals, you should perform what action first?
1. Remove the wires connected to the terminal
 2. Mark the wires for later identification
 3. Remove power to the motor circuit
 4. Disconnect the ground
- IN ANSWERING QUESTIONS 8-6 THROUGH 8-8, REFER TO FIGURE 14-30. ASSUME THE METER IS FUNCTIONING PROPERLY.
- 8-6. The R to S test indicates that the remaining terminal is the common terminal because the resistance of
1. the run winding is high
 2. both windings in parallel are high
 3. the start winding is low
 4. both windings in series are high
- 8-7. The C to S test indicates that the remaining terminal is the run terminal for which, if any, of the following reasons?
1. It has the greatest resistance
 2. It has a much lower resistance
 3. It has the same resistance
 4. It has medium resistance
- 8-8. If, during either the R to S or the C to S test, the ohmmeter needle fails to move, you should check for what problem?
1. An open start relay
 2. A defective winding
 3. An open run capacitor
 4. A shorted start capacitor
- 8-9. Which of the following components is considered a load?
1. Thermostat
 2. High-pressure switch
 3. Set of contacts
 4. Coil of a contactor
- 8-10. An ohmmeter shows a resistance of infinity between the R and C motor terminals during a continuity test. Which of the following faults is indicated?
1. A grounded run winding
 2. An open start winding
 3. A shorted start winding
 4. An open run winding

- 8-11. Assume that you are using a test lamp to check the continuity between the C and S terminals of a motor. What fault is indicated when the light fails to come on?
1. An open in the start winding
 2. A short in the start winding
 3. An open in the run winding
 4. A short in the run winding
- 8-12. Which of the following conditions exists in the case of a shorted winding?
1. A wire is burned in half
 2. The winding has a high resistance
 3. A loop of copper wire is in contact with another wire
 4. A wire is touching the hermetic shell
- 8-13. An ohmmeter indicates a start winding resistance of 4 ohms for a motor that has a run winding resistance of 2.5 ohms. The low resistance of the motor start winding is most likely due to what fault?
1. An open
 2. A short
 3. A grounded start capacitor
 4. A burned current relay
- 8-14. Refer to figure 14-33. What fault is indicated by continuity between one of the motor terminals and the shell?
1. A short
 2. An open
 3. A ground
 4. An overload
- 8-15. Which of the following devices can be used to test a hermetic motor for grounds?
1. Ohmmeter
 2. Test lamp
 3. Megger
 4. Each of the above
- 8-16. Refer to figure 14-26. At what time should the contact points be in the open position?
1. The off-cycle only
 2. The start winding is de-energized
 3. The motor reaches about three-fourths rated speed
 4. Each of the above
- 8-17. Unlike the current relay that responds to starting current in the motor circuit, the voltage relay responds to which, if any, of the following conditions?
1. Current flow through the run winding only
 2. Voltage induced in the start winding
 3. Leveling effect of the run capacitor
 4. None of the above
- 8-18. When the circuit draws excessive current, which of the following starting relays is capable of de-energizing the running winding circuit?
1. Hot wire
 2. Voltage
 3. Current
 4. Each of the above
- 8-19. Refer to figure 14-38. When an overload protector is open, the opening action is the direct result of what condition?
1. Voltage
 2. Heat
 3. Current
 4. Capacitance
- 8-20. What device, if any, is used in the starting circuit of an induction motor to provide leading current through one winding?
1. Overload protector
 2. Starting capacitor
 3. Running capacitor
 4. None
- 8-21. Assume that you are testing the contacts of a voltage-type starting relay with an ohmmeter. The normally closed contacts are working properly in which of the following circumstances?
1. Contacts lack continuity
 2. Negligible resistance exists in the relay coil
 3. Current is not flowing through the contacts
 4. Continuity exists through the contacts

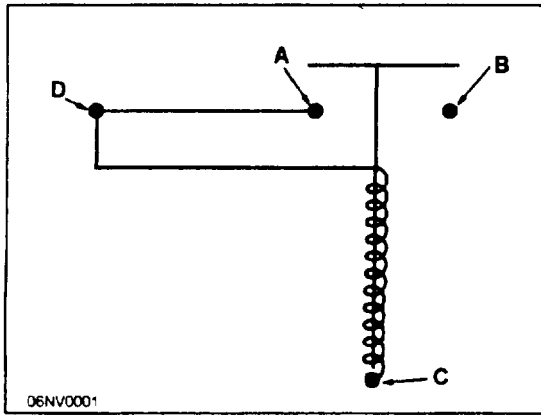


Figure 8A

IN ANSWERING QUESTIONS 8-22 THROUGH 8-24, REFER TO FIGURE 8A.

8-22. At what points should an ohmmeter be connected to test the relay coil?

1. A and B
2. B and C
3. C and D
4. D and B

8-23. At what points should an ohmmeter be connected to test the relay contacts?

1. A and B
2. B and D
3. C and B
4. D and C

8-24. Which of the following ohmmeter test results indicates the contacts of a current relay are satisfactory?

1. Continuity through points A and B
2. Lack of continuity through points A and C only
3. Lack of continuity through points A and B only
4. Lack of continuity through points A, B, and C

8-25. Refer to figure 14-40. Assuming the test is accomplished, which of the following meter readings indicates an open coil?

1. 110 volts
2. 2 ohms
3. Infinity
4. 4 amps

8-26. When a starting relay fails, you can start the compressor motor by bypassing the relay manually using which of the following devices?

1. A test lamp and cable
2. An ohmmeter with four lead wires
3. A test line cord, fuse, and capacitor
4. A jumper placed across terminals C and R and a test lamp

8-27. Which, if any, of the following circuit conditions indicates an internal current temperature overload protector is open in a hermetic motor?

1. Continuity across C and S, C and R, and S and R
2. Open across C and S, C and R, and continuity across S and R
3. Continuity across C and R, and an open across S and R and C and S
4. None of the above

8-28. You are testing a capacitor with an ohmmeter. What general reading on the meter indicates the capacitor is good?

1. Zero resistance and then climbs to high resistance
2. Low resistance
3. Medium resistance

8-29. Which of the following electrical components is NOT part of a load circuit shown in a hermetic system schematic wiring diagram?

1. Compressor motor
2. Start capacitor
3. Thermostat
4. Fan motor

- 8-30. If you are reading voltage across a set of contacts, the contacts are
1. burned
 2. open
 3. shorted
 4. closed
- 8-31. Energy from the sun is received by the earth in what form?
1. Conduction
 2. Radiation
 3. Convection
 4. Diffusion
- 8-32. What term describes the amount of solar energy per unit area per unit of time striking the earth's surface?
1. Solar isolation
 2. Solar radiation
 3. Solar insolation
 4. Solar collection
- 8-33. Which of the following expressions describes the solar constant?
1. 418 Btu/hr-ft²
 2. 2,453 watts/m
 3. 1.940 Langleys/min
 4. Each of the above
- 8-34. What percentage of solar energy is absorbed by the atmosphere?
1. 10% to 20%
 2. 20% to 30%
 3. 30% to 40%
 4. 40% to 50%
- 8-35. What is the average solar intensity in Btu per square foot per day on the ground?
1. 1,200
 2. 1,300
 3. 1,400
 4. 1,500
- 8-36. What is the best and most frequent choice as to the orientation of a solar collector?
1. Grid south
 2. True south
 3. Slightly east of south
 4. Slightly west of south
- 8-37. During what hours of the day does most of the useful energy collection take place?
1. 0700 to 1700
 2. 0800 to 1600
 3. 0900 to 1500
 4. 0900 to 1700
- 8-38. What are the two basic types of solar collectors?
1. Direct and indirect
 2. Oriented and disoriented
 3. Parallel and horizontal
 4. Liquid and air
- 8-39. The absorber plate absorbs solar energy and converts it to which of the following types of energy?
1. Heat
 2. Radiant
 3. Thermal
 4. Electrical
- 8-40. What type of collector is most suitable for low-temperature applications?
1. Air
 2. Liquid
 3. Flat plate
 4. Convex plate
- 8-41. Some collectors are made with a black coating for which of the following reasons?
1. To emit low-frequency infrared radiation
 2. To emit low-frequency ultraviolet radiation
 3. To emit high-frequency incoming solar radiation
 4. To absorb high-frequency incoming solar radiation
- 8-42. What is the most commonly used substance for collector covers?
1. Film
 2. Glass
 3. Plastic
 4. Transparent tape

- 8-43. What is the percentage of transmissivity for standard plate glass?
1. 86%
 2. 76%
 3. 66%
 4. 56%
- 8-44. What is the cheapest and most obtainable collector fluid?
1. Air
 2. Water only
 3. Alcohol only
 4. Water and alcohol
- 8-45. Air is not preferred as the collector fluid in domestic solar water heating for which of the following reasons?
1. It freezes
 2. It corrodes
 3. It has a high density
 4. It has a low-heat capacity
- 8-46. What freeze protection method has a pump to circulate the water through the collectors until the freezing temperatures are over?
1. Drain-up method
 2. Drain-down method
 3. Recirculating method
 4. Supercirculating method
- 8-47. What are the types of heat transfer fluids?
1. Silicones and hydrocarbon oils
 2. Nonaqueous and aqueous
 3. Inhibited distilled water and silicones
 4. Inhibited glycol/water mixtures and hydrocarbon oils
- 8-48. What is the flash point of silicone fluids?
1. 450°F
 2. 400°F
 3. 350°F
 4. 300°F
- 8-49. Silicone fluids are limited to systems with what maximum temperature?
1. 350°F
 2. 400°F
 3. 450°F
 4. 500°F
- 8-50. What substance is added to water to make it a useful collector fluid?
1. Ethylene glycol
 2. Methylene glycol
 3. Silicone glycol
 4. Aluminum glycol
- 8-51. A 50-50 water and glycol mixture will protect against freezing down to about what temperature?
1. -10°F
 2. -20°F
 3. -30°F
 4. -40°F
- 8-52. Which of the following types of collectors uses a vacuum between the absorber and the glass outer tube to reduce convection and conduction heat losses?
1. Evacuated tube
 2. Flat plate
 3. Concentrating
 4. Intensifying
- 8-53. Which of the following types of collectors intercepts direct radiation over a large area and focuses it onto a small absorber area?
1. Evacuated tube
 2. Flat plate
 3. Concentrating
 4. Intensifying
- 8-54. Which of the following collectors collects energy by reflecting direct solar radiation off a large curved mirror and onto a small absorber tube?
1. Linear-trough fresnel lens
 2. Parabolic trough
 3. Compound parabolic mirror
 4. Simple parabolic mirror
- 8-55. Which of the following collectors focuses incoming rays onto a small absorber plate or tube through which the heat transfer liquid is circulated?
1. Linear-trough fresnel lens
 2. Parabolic trough
 3. Compound parabolic mirror
 4. Parabolic fresnel lens

- 8-56. what amount of water storage is needed per square foot of collector?
1. 10 pounds
 2. 15 pounds
 3. 20 pounds
 4. 25 pounds
- 8-57. In air collector systems, latent heat is stored in a material as it changes phase from a
1. liquid to a gas
 2. gas to a liquid
 3. liquid to a solid
 4. solid to a liquid
- 8-58. More expensive, specially fabricated fiber glass or plastic tanks can withstand heat up to what temperature?
1. 450°F
 2. 350°F
 3. 250°F
 4. 150°F
- 8-59. For typical family residences, each person accounts for approximately how many gallons of hot water per day?
1. 10
 2. 20
 3. 30
 4. 40
- 8-60. What is the primary advantage of a thermosiphon system of water storage?
1. It uses a lightweight tank
 2. It needs no pump or controller
 3. It connects directly to the potable water supply
 4. It can use a heat exchanger
- 8-61. What factors contribute to the reduction of heat loss from a rock bed?
1. The density and proclivity
 2. The intensity and range
 3. The conduction and convection is considerable
 4. The conduction and convection is small
- 8-62. What type of heat storage is well suited for warehouses and factories that have mainly daytime operations?
1. No-storage air heating
 2. Rock bed
 3. Air type of space heating
 4. Thermosiphon
- 8-63. Most baseboard heaters require approximately what temperature?
1. 150°F
 2. 160°F
 3. 170°F
 4. 180°F
- 8-64. During the winter, a liquid type of solar system is rarely operated at delivery temperatures above
1. 130°F
 2. 140°F
 3. 150°F
 4. 160°F
- 8-65. The water-to-air heat pump can effectively use heat from solar storage at what temperature?
1. 25°F
 2. 35°F
 3. 45°F
 4. 55°F
- 8-66. Midday collection temperatures are usually within what range?
1. 120°F to 150°F
 2. 130°F to 170°F
 3. 140°F to 160°F
 4. 150°F to 180°F
- 8-67. An oil slick on a water surface blocks the flow of what element from the atmosphere into the water?
1. Hydrogen
 2. Ozone
 3. Oxygen
 4. Carbon dioxide

8-68. On a naval base, what department normally disposes of oil waste residues?

1. PWD
2. DPDO
3. NPDO
4. DDPO

8-69. In what type of approved container should you store oil-soaked absorbent materials for proper disposal?

1. DPDO
2. NPDO
3. APE
4. EPA

8-70. After observing contaminated water from a vehicle washrack polluting the water, you should immediately contact what person?

1. Washrack operator
2. Washrack supervisor
3. Company commander
4. Assistant company commander

8-71. When unburned hydrocarbons and various other fuel components combine chemically, which of the following by-products is normally formed?

1. Carbon monoxide
2. Carbon dioxide
3. Sulfur dioxide
4. Lead sulfite

8-72. What three terms are associated with asbestos dust particle size?

1. Centimeter, millimeter, micron
2. Millimeter, micron, angstrom
3. Centimeter, micron, manometer
4. Micron, nanometer, angstrom

8-73. Air must be scrubbed with a special air filtration machine to remove what size of asbestos dust particles?

1. Millimeter
2. Micron
3. Angstrom
4. Nanometer

8-74. When involved in an asbestos removal project, you should obtain which of the following instructions for guidance?

1. DPDOINST 5100.24
2. OPNAVINST 5100.23
3. OPNAVINST 5110.23
4. OPNAVINST 5200.23

